**International Journal of Research in Engineering and Applied Sciences(IJREAS)**
Available online at http://euroasiapub.org/journals.php
Vol. 7 Issue 2, February-2017, pp. 42~45
ISSN (O): 2249-3905, ISSN(P): 2349-6525 | Impact Factor: 6.573 | Thomson Reuters Researcher ID: L-5236-2015

# Effect of carbon and nitrogen sources on growth of *Colletotrichum* sp.

**Gawai D.U.[1],**

**Shinde Jayshri U.[2]**

Botany Research Laboratory and Plant disease clinic,
P.G. Department of Botany
N.E.S. Science College, Nanded (M.S.), India.

**ABSTRACT**

The effect of carbon and nitrogen nutrition on the growth of *Colletotrichum coccodes* isolated from tomato, *Colletotrichum capsici* from chilli. *Colletotrichum gloeosporiosides* isolated from pepper were studied. Among carbon sources glucose, lactose and sucrose were found to the best for growth of *Colletotrichum capsici*. Glucose, sucrose and fructose were found to the best for growth of *Colletotrichum gloeosporiosides* and *Colletotrichum coccodes.* It is also evident from the results that potassium nitrate ,casein and calcium nitrate were found to be good for the growth of *Colletotrichum capsici*, For *Colletotrichum gloeosporiosides* peptone, potassium nitrate and peptone and sodium nitrate were found to be best nitrogen sources for the growth of *Colletotrichum coccodes*.

**Keywards :**
*Colletotrichum* species, tomato, pepper, chilli, carbon and nitrogen sources.

## Introduction:

*Colletotrichum* is one of the most economically important genus affecting a wide host range, especially on tropical and subtropical crops as well as fruit trees (Sutton, 1992). Above ground plant parts can be affected by *Colletotrichum* diseases at all stages on stems, leaves, flowers and fruits.

Anthracnose caused by *Colletotrichum capsici* is a devasting disease of chilli (*Capsicum annum* L). It reduces the marketable yield from 10 to 80 % of the crop disease (Poonpolgul and Kumphai ,2007), it is prevalent in almost all the major chilli growing areas in India. It is reported to cause 10 to 30 % loss in Punjab (Rai and Chohan, 1996). 8 to 27 % in Maharashtra (Dattar, 1995) and 25 to 48 % in Karnataka (Ekbote, 2001).

*Colletotrichum* gloeosporioides is the most destructive pathogen of pepper (Amusa, et.al. 2004) and cause losses by pre and post emergence damping off, leaf spots, pre mature fruit drop, mummification of unripe green pepper fruits and fruits rots (Agrios, 1988). Several farmers abanding pepper production as a reswt of the disease (Amsusa, et.al. 2004). Fruits of hot and

sweet peppers (*Capsicum* spp.) are susceptible to several diseases including anthracnose and fruits rot. The disease limits production and losses occur in the field, in transit, and in storage. The primary losses occur on fruit because of any infection on the fruit reduces its quality and sale.

Tomato is a major contributor to the fruit vegetable diet of humans. It is cultivated in essentially all countries either in field or in protected culture. It is one of the most important vegetable crops in India and other countries. In India it is used for food and industrial purpose, It is severally affected by various diseases, but anthracnose is one of the major disease of tomato affecting tomato fruit and other parts which lead to heavily losses in the yield and marketability.

Carbon and Nitrogen are essential elements for the growth and sporulation of fungi. Utilization of carbon and nitrogen containing compounds by fungi depends on their ability to assimilate them, directly or after conversion into simple compounds. (Lilly and Barnett, 1951)

## Material and Methods:

During present investigations the infected tomato, pepper and chilli sample, were collected from local market of Nanded (M.S.) The diseased pepper, chilli and tomato samples were preliminary identified on the basis of sporulation like asexual and sexual spores on fruiting structures under compound microscope and identified with the help of manuals (Subramanian; 1971; Neegaard and Mathur; 1980; Jha, 1993, Mukadam et.al. 2006).

Fungus cultures were selected and cultured on basal medium containing glucose 10g, potassium nitrate 5g, potassium dihydrogen phosphate 1g, magnesium sulphate 0.5g and distilled water to make 1000 ml. glucose and potassium nitrate in the medium were replaced by different carbon sources as like glucose, fructose, sucrose, maltose, lactose, gelatin, mannitol, starch and potassium nitrate, Ammonium nitrate, Ammonium molybdate, peptone, casein, calcium nitrate, Ammonium chloride as nitrogen sources. The medium was autoclaved and pH was adjusted to 6.0 each flask containing 25 ml of the medium was inoculated with 5 ml fungal spore suspension and incubated for 10 days at $25^0$C and filtered mycelial mat was dried.

## Results and Discussion:

Among eight carbon nitrogen sources glucose (270 mg) lactose (190 mg) was found tobe most favourable for the growth of *Colletotrichum capsici* and sucrose (190 mg), glucose (210 mg) was best for growth and sporulation of *Colletotrichum gloeosporioides.* Sucrose (240 mg), fructose (190 mg) were found to be favourable for the growth of *Colletotrichuum coccodes.* However, Gelatin, fructose, maltose, mannitol showed poor growth and sporulation in *Colletotrichum capsici*, *Colletotrichum* gloeosporioides and *Colletotrichum coccodes* respectively.

In another side among the eight nitrogen sources potassium nitrate (240 mg) and casein (205 mg) were superior for the growth of *Colletotrichum capsici*, while *Colletotrichum* gloeosporioides showed best growth with peptone (305 mg), potassium nitrates (290 mg). *Colletotrichum coccodes* showed maximum growth with potassium nitrate (370 mg) and peptone (340 mg). A very poor growth of *Colletotrichum capsici*, *Colletotrichum gloeosporioides* and *Colletotrichum coccodes* observed with ammonium chloride (80 mg), Ammonium molybdate (90 mg) and Ammonium nitrate (80 mg).

Hedge et.al. (1990) reported that glucose and sucrose are good carbon sources for the growth of *Colletotrichum gloeosporioides* isolated from Areca nut. Bhandari and Singh (1976) reported glucose as best for growth of *Alternaria tritici.* (Pandey and Shukla(1978)observed

better growth of *Helminthosporium* sp.on sucrose. These findings supports the present study. Similar results were also reported by Reddy (1972). Kaif and Tarr (1966), Agarwal and Shinkhede (1959) and Singh (1972).

Fungus utilizes both inorganic and organic sources of nitrogen (Cochrane, 1958). Among inorganic sources nitrates are more popular nitrogen sources for number of fungi. Ammonium nitrate has also been reported as a fairly good nutrition source for growth and sporulation of *Aspergillus flavus* (Olutiola, 1976). In Rhizospheric fungi i.e. *Aspergillus flavus, Aspergillus niger*, and *Aspergillus nidulans* isolated from pigeonpea showed good sporulation in glucose, fructose and sucrose, and in nitrogen sources potassium nitrate was found to be best for growth of *Aspergillus flavus*. While peptone for *Aspergillus flavus* and *Aspergillus* nidulans. (V. Jalander and B.D. Gachande)

The growth of all the three fungi was significantly higher under the influence of potassium nitrate, peptone and calcium nitrate; peptone was the best organic nitrogen source as it represents mixture of amino acids, (Cochrane,(1958,Ghosh (1969).

Table -1 : Effect of Carbon sources on the growth of *Colletotrichum* sp.

| Carbon Sources | Mycelial dry weight (mg) | | |
|---|---|---|---|
| | *Colletotrichum capsici* | *Colletotrichum* gloeosporioides | *Colletotrichum* coccodes |
| Glucose | 270 | 210 | 170 |
| Fructose | 140 | 160 | 190 |
| Sucrose | 180 | 190 | 240 |
| Maltose | 130 | 80 | 120 |
| Lactose | 190 | 145 | 90 |
| Gelatin | 90 | 60 | 120 |
| Mannitol | 120 | 90 | 95 |
| Starch | 180 | 150 | 120 |
| Control | 15 | 25 | 30 |

Table -1 : Effect of Nitrogen sources on the growth of *Colletotrichum* species

| Nitrogen Sources | Mycelial dry weight (mg) | | |
|---|---|---|---|
| | *Colletotrichum capsici* | *Colletotrichum* gloeosporioides | *Colletotrichum* Coccodes |
| Potassium nitrate | 240 | 290 | 370 |
| Sodium nitrate | 200 | 270 | 295 |
| Ammonium nitrate | 140 | 90 | 160 |
| Ammonium Chloride | 80 | 110 | 135 |
| Ammonium molybdate | 90 | 135 | 240 |
| Peptone | 150 | 305 | 340 |
| Casein | 205 | 135 | 195 |
| Calcium nitrates | 210 | 190 | 290 |
| Control | 10 | 20 | 15 |

## References :

1) Agrawal, S.C. and C.G. Shinkhede (1959). Phytopathology 13:45.2) Agrios- G.N. (1988), Plant Pathology, 2nd Edi Academic press, New York. 630 P.P.

3)Amusa N.A., Kehnde I.A. and Adegibite, A.A. (2004). Pepper fruit anthracnose in the humid forest region of south western Nigeria, Nitration and food science, 34 (3) : 130-134.

4)Bhandari, J.K.S. and R.S. Singh (1976). Indian Phytopathology 29 (1):88.

5)Cochrane, V.W. (1958). "Physiology of Fungi". John wiley and sons, New York, 524 PP.

6)Dattar, V.V. (1995). Pathogenicity and effect of temperature on the six fruit rot of chilli. Indian Journal Mycology plant pathology. 25:312-313.

7)Ekbote S.D. (2001), Survey for Chilli disease in Haveri district of Karnataka. Karnataka J. Agric. Sci., 1. 726-728.

8)Gosh, S.K. (1969). "Physiological and biochemical studies on four isolates of Macrophomina phaseoli (Maubl.)" A Abhby". Ph.D. Thesis, Kalgani University, West Bengal.

9)Hedge,, V.K., P.K. Hedge and S.Kulkarni (1990).Mysore J.of Agric.Sci :24:358

10)Jha D.K., (1993) A text book on seed pathology, vikas publishing house. Ltd. New Delhi, 132 PP. (Report 1935)

11)Kaif, A. and S.A. J. Taar (1966). Trans. Brit. Mycology Soc. 49:327.

12)Lilly, V.G. and Barnett, H.L. (1951), "The physiology of fungi." Macraw-Hill com., Inc. NewYork.

13)Mukadam, D.S., Patil, M.S. Chavan A.M. and Pal A.R. (2006), The illustration of fungi, Saraswati Printing Press, Aurangabad, India.

14)Poonpolgul, S and Kumphai, S. (2007), Chilli pepper anthracnose in Thiland. Camtry Report. Abs, the first in symp, Chilli Anthracnose, 23 P.

15)Rai, I.S. and J.J., Chohan, (1996). Studied on variation and penetration of Choletotrichum capsici (Syd.) Butter and Bisby causing fruitrot of Chilli in Punjab. J. res, Punjab Agric. Unic. 3:32-36.

16)Olutiola, D.O. (1976),. Mycol. Soc. 66:131.

17)Pandey, S.C. and T.N. Shukla (1978). Indian Phytopathology, 31(1) : 73.

18)Singh B.P. (1972). Indian Phytopathology. 26:80.

19)V. Jalander and B.D. Gachande (2011) Effect of carbon and Nitrogen sources on growth of Rhizospheric fungi of pigeonpea (CAJAN L. MILLSP.) Bioinfolet 8 (2) : 187-189.